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Notes on *Carex*. IX.

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1. *Carex pansa*. One of the *Multifloræ*: extensively creeping by a woody horizontal rootstock 2 to 4 inches deep: culm scabrous above, stiff and erect or nearly so, about a foot high, exceeding the narrow long-pointed stiff and tufted leaves: spikes 6 to 10, ovoid, less than half inch long, dark brown or nearly black when mature, aggregated into an oblong or ovoid loose head an inch or less long: scales thin, very broadly ovate, dark brown with a broad white-hyaline margin, sharply acute or acuminate: perigynium ovate, flat and nerveless on the inner face, rounded and obscurely few-nerved or nerveless on the outer face, contracted into a short but distinct and slender nearly entire beak, becoming nearly black, completely hidden by the scale.—“Very abundant in drifting sand as well as borders of sea estuaries, Clatsop, Oregon, and Ilwaco, Washington Territory,” *L. F. Henderson*.—This should be no. 237*a* in my Synopsis; intermediate between the *Multifloræ* and *Fœtidæ*.

2. *C. ablata*.—*C. frigida* of American botanists, not Allioni.—There has always been a doubt as to the proper disposition of the American plant which has been called *C. frigida* All. Mr. Olney first referred it to *C. sempervirens* Vill., which it very much resembles, but from which it is distinguished, among other things, by the notched orifice of the perigynium. The accumulation of considerable material from our western territory, and a fine suite of European specimens obtained through the courtesy of Dr. Christ, of Basel, have enabled me to determine the fact, which I have always suspected, that the American plant is not the same as the European. *C. ablata*, as I designate the American species, is distinguished from *C. frigida* chiefly as follows: Culm stiffer and more erect: leaves broader and firmer, usually shining, commonly shorter: staminate spike smaller, nearly sessile: pistillate spikes shorter and thinner, lighter colored, shorter stalked, the upper 2 or 3 usually aggregated and sessile or very nearly so: scales obtuse, usually shorter: perigynium not so long and slender-beaked.

3. *C. grisea* Wahl., emend.—This species presents three well marked forms: the type, a robust leafy plant with large

inflated perigynia, occurring in the most northern states; a more slender form with slimmer pointed perigynia, growing in the middle and southern states; a depauperate form with very short perigynia, found in the southwest. The following characters distinguish these plants:

Type: Stout, leaves broad ($\frac{1}{4}$ inch wide usually): bracts broad and leaf-like, diverging, very much exceeding the culm: spikes heavy: perigynia much inflated, blunt: scale nerved below, cuspidate or muticous, all except the lowest ones shorter than the perigynium. Boott, t. 86.—New England to Michigan and Illinois, and Pennsylvania.

Var. *angustifolia* Boott, Ill. 34, t. 87.—*C. laxiflora* Ell. Sk. Bot. Car. ii, 549. *C. grisea* var. *minor* Olney, Hall's Pl. Tex. 25.—Much more slender, the culms usually weak: leaves scarcely half so wide as in the species, the bracts especially much narrower and shorter, more erect: spikes more slender, appearing two-ranked (in dried specimens at least): perigynium scarcely inflated, trigonous-oblong, bearing a sharp beak-like point: scale nerveless or very nearly so, longer, sharper, and more spreading than in the species.—Southern Ohio, Pennsylvania and New Jersey, southward to Florida and Texas. Common in the middle states. The variety, as outlined here, includes somewhat more than Dr. Boott evidently intended to designate, but there are no characters, so far as I know, which separate the extreme southern very narrow-leaved form from the plants of the central states. It is still a question as to the relationship of this variety with *Carex oligocarpa* Schk.

Var. *globosa*. Usually low (three to eight inches high, varying to over a foot in the more developed forms): spikes few-flowered (often containing only two or three perigynia): perigynium short, inflated, very blunt, nearly globose or somewhat obovate: scales short, not conspicuously cuspidate, or the upper ones wholly muticous.—St. Louis, Mo., *Eggert*, Arkansas, *Hasse* (specimens somewhat intermediate between this and var. *angustifolia*), Texas, *Neally*.

4. *Carex flava* Linn., emend.—*Carex flava* is a puzzling species. It varies towards *C. Oederi* Retz, a species which may not be distinct. Yet there appears to be a satisfactory line of demarcation between the two, and a greater accumulation of confusing material must come in before their union can be justified. The essential characters of typical *C. flava*

are: Plant one to two feet high, having a peculiar yellowish cast which extends to the perigynia: leaves shorter than the culm: bracts long, conspicuously spreading, the lowest much longer than the remaining portion of the culm: spikes borne close together near the top of the culm, sessile (the lowest rarely short-stalked): perigynium bearing a long and slender beak which is very conspicuously reflexed. The essential contrasting characters of *C. Œderi* are: Plant smaller, greener: leaves equaling or exceeding the culm: bracts strictly erect: spikes much smaller and much more closely aggregated: perigynium conspicuously smaller, the beak short and straight. The spikes often have a whitish cast. *C. flava* presents two marked varieties. From the type of *C. flava*, as characterized above, its varieties may be separated as follows:

Var. **recterostrata**. Plant less yellow, or entirely green: spikes more scattered, the lowest two or three inches remote and usually conspicuously stalked: beak shorter, straight or nearly so.—Vancouver Island, *Macoun*, and possibly across the continent. *C. viridula* Boott, Ill. t. 523, may possibly belong here, judging from the spreading bracts, although the perigynia are rather those of *C. Œderi*. There are no descriptive notes on this plant in the text, but it is said to be figured from Massachusetts specimens. In my own herbarium there are no specimens of this anomalous variety from the eastern states, but specimens which I have seen elsewhere, as I recall them, are probably to be referred here. The plant is not much smaller than the type.

Var. **minor** Townsend, Journ. Bot. xix, 161. Much lower than the species, eight inches or less high, green: leaves proportionately broader, as long as or longer than the culm, which is often not erect: spikes more or less scattered, almost entirely lacking the yellow color of those of the type, the lower one or two conspicuously stalked: beak shorter, straight.—Atco, N. Jersey, *I. C. Martindale*. Introduced? Common in England.

5. **Carex aperta** Boott, emend.—This species was founded upon plants collected by Scouler and Douglas on the Columbia river. The author erected a var. β at the same time that he proposed the species. This variety, founded upon specimens from the far north, was afterwards (Ill. 182) referred by its author to *C. caespitosa* var. *filifolia* Boott. In the mean

time he had made another var. β (Ill. 132, t. 426), founded upon plants from the eastern United States. This latter variety has ever since been regarded as *C. aperta* Boott, in Gray's Manual and elsewhere, except in the instance of Olney's fascicles, where it was designated as *C. aperta* var. *minor* Olney. As none of the recent collections from Oregon or Washington contain specimens which could be confidently referred to *C. aperta*, the species has held its place in our eastern flora through sufferance. A recent careful examination of one of Scouler's specimens, which is deposited in herb. Gray, reveals the fact that it is the same as the plant now provisionally known in this country as *C. acuta* var. *prolixa* Hornem. The specimen appears to have been one of the more slender plants of the original collections, judging from the figure in Hook. Fl. Bor.-Am., which figure well represents the robust forms of *C. acuta* var. *prolixa*. The plant of the eastern states can not be considered as belonging to the original *C. aperta*, and I therefore separate it as

C. stricta Lam., var. **decora**.—*C. aperta*, authors, not Boott. *C. aperta* Boott, β , in part, Ill. 132, t. 426. *C. Haydenii* Dew. Sill. Journ. 3d ser. xviii, 103, probably. *C. aperta* var. *minor* Olney, Exsicc. fasc. v. no. 15.—Usually smaller and more slender than the species, the basal sheaths not fibrillose: spikes short (seldom over an inch long), sessile or very nearly so, only very rarely attenuated at the base, spreading, the terminal staminate flowers few: bracts usually conspicuously spreading: scales very sharp, spreading, longer than the perigynium.—From New England to Illinois and Wisconsin; evidently also in Nebraska, Oregon and Washington. Apparently rare.

6. Carex canescens Linn., emend.—There are three marked types of variation in *Carex canescens*: (1) A slender and reduced form of the species, very common throughout the northern states; (2) a dwarf series with brown or fulvous spikes, subalpine or alpine; (3) a robust and very leafy form in which the spikes are aggregated into a head, the perigynia long-pointed. Singularly enough, the first form has never had a name, although it has passed as var. *vitis* and var. *alpicola*, unless Læstadius' var. *subloliacea* may be applied to it. It is very doubtful, however, if this var. *subloliacea* can be legitimately pressed into service for our American plant. Andersson's account of it extends no farther than the fruit and spikes—"spiculis parvis, subglobosis,

remotioribus, fructibus margine sublævibus"—and Boott says that it differs from the species only in the small spikes and the smooth perigynium. Boott knew it only as a Lapland plant. Moreover, the very few specimens to which I have had access differ from the species only in the points designated. Our plants, on the contrary, differ from the species in their very slender and lax habit as well as in the characters of perigynium and spikes. I have therefore separated them from the species as an unpublished variety. The second series of variations may all be included under var. *alpicola* Wahl., with the exception of the dubious var. *dubia* Bailey, and the third under var. *polystachya* Boott.

Var. *vulgaris*.—Var. *alpicola* Bailey in part, Proc. Am. Acad. xxii, 143; distrib. Carices, 1886.—Differs from the species in its more slender culm and laxer habit, its small spikes, and usually smaller and spreading perigynia. This variety bears the same relation to *C. canescens* that var. *microstachya* bears to *C. echinata*. Typical *C. canescens* is a stout plant, with compact spikes one-fourth or three-eighths inch long. Both the species and this variety are characterized by a silvery color of the spikes.—Common throughout the northern states and Canada, to Idaho, and perhaps farther westward.

Var. *alpicola* Wahl. Fl. Lapp. 232.—*C. curta*, var. *brunnescens*, Pers. Syn. ii, 539; *C. Richardii* Michx. Fl. Bor., Am. ii, 170; *C. vitilis* Fries, Mant. iii, 137; *C. canescens*, β Torr. Monogr. 393; *C. canescens* var. *sphaerostachya* Tuckerm. Enum. Meth. 10, 19; *C. Buckleyi* Dew. Sill. Journ. 1st ser. xlviii-143; *C. sphaerostachya* Dew. l. c. xlix, 44; *C. canescens* var. *vitilis* Carey, Gray's Man., 2d ed., 514; *C. canescens* var. *brunnescens* Boott, Ill., 220; *C. vitilis* var. *brunnea* Olney, Bot. King's Rep., 364; *C. vitilis* vars. *alpicola* and *sphaerostachya* Olney, Exsicc. fasc. v. nos. 3 and 4.—Smaller than the species (seldom much over a foot high), the culm stiff in the alpine forms, more or less slender in the subalpine forms: spikes small and globular or nearly so, well defined, brown or tawny. Varies from the short, stiff and brown alpine forms—the typical var. *alpicola*—into various lax and paler forms of intermediate regions. --Common on mountains across the continent, reaching as far south as Georgia, and occurring sparingly in intermediate regions along the northern borders of the United States.

7. *C. Deweyana* Schw., var. *sparsiflora*.—*C. Bolanderi* var. *sparsiflora* Olney, Proc. Am. Acad. 1872, 407 (Hall's no. 580).—The most reduced form of *C. Deweyana*: plant laxer in habit than the type: leaves narrower: spikes smaller: perigynium twice smaller, more or less excurved. This is commonly confounded with forms of *C. canescens*, with which it was united in my Synopsis, 144. From the small forms of *C. canescens* this plant is distinguished by its much laxer habit, broader and soft leaves, the culm very weak or often zigzag above, the perigynia much narrower, longer (lanceolate or narrowly ovate-lanceolate), long-pointed, more or less excurved, borne in loose spikes which are generally subtended by a bract.—From Idaho to Oregon and Vancouver Island. *C. Bolanderi* vars. *elongata* and *minor* Olney, l. c., are unimportant forms of *C. Deweyana* var. *Bolanderi* W. Boott.

8. *C. arctata* Boott, var. *Faxonii*.—Spikes shorter than in the species, usually short-peduncled, erect or nearly so, much more densely flowered, part of them usually contiguous at the top of the culm, rendering the shorter staminate spike inconspicuous: perigynium usually much larger.—Sugar Hill, Lisbon, N. H., *Edwin Faxon*, 1887; extreme northern Minnesota, *Bailey*, 1886; northwestern Ontario at Nipigon, *Macoun*, 1884, and Michipicoton, *Geo. Barnston*, 1860.

As *Carex arctata* is often confounded with *C. debilis*, it may be well at this place to state the essential points in which it differs from *C. debilis*: Radical leaves broader and shorter: perigynium shorter (2 lines or less long), abruptly contracted into a beak, abrupt and conspicuously stipitate below, more loosely disposed on the spike and more spreading, scarcely longer than the very sharp or cuspidate scale.

9. *C. rosea* Schkuhr, var.? *Arkansana*. Differs from the species in its mostly stouter culm, the spikes much larger and more aggregated and subtended by very long (3 to 6 inches) leaf-like bracts with dilated bases, scales broader and conspicuously awn-pointed, perigynium much larger and broader.—Plentiful in the bottom of La Fourche creek, near Little Rock, Ark., growing beneath underbrush where heavy timber has been cut, *Dr. H. E. Hasse*. This plant suggests *C. Muhlenbergii* var. *australis*.

10. *Carex salina* Wahl., var.? *robusta*. Taller and coarser than the species (2 to 3 feet high), the culm spongy at

the base: leaves soft: bracts very leafy, surpassing the culm: spikes heavy, short and thick (an inch or less long usually and one-quarter or one-half inch thick), mostly dense and truncate at the base, somewhat aggregated, the lower short-stalked: scales various, from lanceolate and acute to ovate and obtuse, brown with a white nerve, longer than the thinner nerveless perigynium.—Salt marsh, Vancouver Island, 1887, *Macoun*. A singular plant with very bushy spikes, variable in character. The perigynia are all empty.

11. *Carex Liddoni* Boott, var. *incerta*.—*C. adusta* var. *congesta* W. Boott, Bot. Calif. ii, 238.—Usually lower than the species (about 18 inches high), the culm much more slender: leaves evidently proportionally longer (nearly as long as the culm): heads shorter (three-fourths inch or less long), much more dense: perigynium somewhat smaller, nerveless or very nearly so.—Summit Camp, California, *Kellogg*.

12. *C. Jamesoni* Boott, var. *gracilis*. Differs from the species in its much more slender and flexuose spikes, which are longer peduncled. *C. Jamesoni* β Boott, Ill. 109, t. 335 — The specimen figured and described by Boott is from northern South America. I refer here, with much uncertainty, two specimens collected in southern Mexico in 1853 by Fred. Müller, nos. 1,337 and 1,338. These specimens are much more slender than that figured by Boott, smaller (one and a half to two feet high), leaves narrower, the spikes fewer and rather more slender and the perigynium somewhat excurved. A larger suite of specimens is necessary for a close determination. Müller's 649 is *C. Jamesoni* Boott, t. 334, and no. 1,336 and part of 1,977, the latter from Orizaba, are *C. Jamesoni* γ , tt. 336 and 337. It seems to me that the var. γ should be referred to the type.

13. *Carex triceps* Michx., var. *Smithii* Porter in litt.—*C. Smithii* Porter; Olney, Exsicc. fasc. i. no 28.—More slender than the type: whole plant, except the sheaths, glabrous or nearly so: spikes smaller ($\frac{1}{2}$ in. or less long by $\frac{3}{16}$ in. wide), the lower one or two usually short-peduncled: perigynium mostly smaller: scales, especially of the staminate portion, commonly shorter, less squarrose and not so sharply pointed.—Southeastern Pennsylvania, southern New Jersey and southward.

14. *Carex lurida* $\times$ *retrorsa*. Distinguished from *C. lurida* Wahl., which parent it most closely resembles, by its straw-

colored perigynia, which are less inflated and much more spreading, standing at nearly right angles to the axis of the spike.—Lansing, Mich. A large clump of this *Carex* was found growing between clumps of *C. lurida* and *C. retrorsa*. Its habit and characters were such as to at once place its hybrid origin beyond a doubt. It also explains certain ambiguous specimens which have been sent me for name—I can not now recall from whom—and which I recollect to have referred to *C. lurida*. Without an intimate acquaintance with *C. lurida* this hybrid will not be readily recognized. It is very likely to be mistaken for *C. tentaculata*. It resembles very closely *C. tentaculata* × *lurida* Bailey (*C. tentaculata* var. *altior* Boott). Infertile.

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The distribution of Isoetes.

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The species of Isoetes have been neglected by collectors in many localities, so that our knowledge of their distribution is likely to be considerably modified by further discoveries. Forming, as they do, an inconspicuous element in aquatic vegetation and still more rarely seen in marshy places, they are easily passed by unless one is specially searching for them. Their resemblance to sterile aquatic sedges or *Juncus* increases the probability of their being overlooked. It may be of interest to note something of the distribution and history of our native species during the six years which have passed since the publication of Dr. Engelmann's valuable monograph¹, as well as to note some of the remarkable features of their distribution on other continents. The species were classed by Engelmann as "submerged," "amphibious" and "terrestrial." Baker² makes four groups to which similar terms are differently applied, his group "Aquaticæ" including only a part of Engelmann's "submerged" species, his group "Subaquaticæ" including the remainder, together with Engelmann's "amphibious" species, his group "Am-

¹The genus Isoetes in North America. In Trans. St. Louis Academy of Science iv, 358-390 (1882).

²Fern Allies, p. 124 (1887).